CLAIMS

1. A method for manufacturing optical preforms, in which one or more layers of glass, doped or undoped, are deposited onto the internal surface of a hollow substrate tube, which deposition is effected by supplying one or more reactive gas mixtures of glass-forming compounds to the interior of the hollow substrate tube and subsequently generating a non-isothermal plasma in the hollow substrate tube, after which the substrate tube provided with layers of glass by means of a deposition process is subjected to a contraction process for the purpose of forming a massive rod, from which optical fibres are drawn, characterized in that the contraction process comprises the steps of:

i) providing a hollow substrate tube enveloped by a protective tube, which protective tube is stationary with respect to the hollow substrate tube, with the hollow substrate tube being enveloped by the protective tube along substantially the entire length thereof,

ii) providing a resonator which surrounds the protective tube,

iii) supplying a plasma-forming gas to the annular space present between the outer circumference of the hollow substrate tube and the inner circumference of the protective tube,

iv) generating a non-isothermal plasma in said annular space,

v) reciprocating the resonator in longitudinal direction with respect to the protective tube for the purpose of contracting the hollow preform into a massive rod.

2. A method according to claim 1, characterized in that the hollow substrate tube and the protective tube are kept in a horizontal position while steps i)-iv) are being carried out.

3. A method according to any one or more of the preceding claims, characterized in that the hollow substrate tube is rotated during

step v), followed by controlled cooling thereof.

4. A method according to any one or more of the preceding claims, characterized in that the plasma is adapted to the increased volume of the annular space during step v).

5. A method according to any one or more of the preceding claims, characterized in that a mixture of argon and oxygen is used as a plasma-forming gas.

6. A method according to any one or more of the preceding claims, characterized in that the pressure during the contraction process is < 50 mbar, in particular 10-25 mbar.

7. A method according to any one or more of the preceding claims, characterized in that a gas having a high temperature during the deposition process is introduced into said annular space.

8. A method according to any one or more of the preceding claims, characterized in that the protective tube is made of a ceramic material having a higher plasticizing temperature than the material of the hollow substrate tube to be contracted.

9. A method according to any one or more of the preceding claims, characterized in that the contraction process comprises an additional step vi), which step vi) comprises the reciprocating of the resonator in longitudinal direction with respect to the protective tube for the purpose of contracting the protective tube.

10. A method according to any one or more of the preceding claims, characterized in that the protective tube is provided with cooling means.

11. A method according to any one or more of the preceding claims, characterized in that the deposition process and the contraction process are carried out in one and the same device.

12. A method according to any one or more of the preceding claims, characterized in that the contraction process is carried out following on the deposition process.

13. A method according to any one or more of the preceding claims, characterized in that one or more glass-forming compounds is (are) added to the gas used in step iii).

14. A method according to any one or more of the preceding claims, characterized in that the contraction into a fully massive rod is terminated prematurely in step v), for which contraction the same plasma as used in the deposition process and/or the plasma generated in the annular space may be used.

15. An optical fibre, characterized in that the refractive index contrast

$$\Delta_i = \frac{n_i^2 - n_{cl}^2}{2 \cdot n_i^2} \cdot 100\%$$

wherein:

Δ_i = refractive index contrast of specific layer i,

ni = refractive index of layer i,

n_{cl} = refractive index of the cladding, i.e. the outer layer of the fibre

has a value according to which $\Delta_i > 2{,}5\%$.

16. An optical fibre according to claim 15, characterized in that $\Delta_i > 3\%$.

17. An optical fibre, characterized in that in that the thermal coefficient of expansion

$$\alpha = \frac{1}{l_0} \cdot \frac{\Delta l}{\Delta T} \ [\mathrm{K}^{-1}]$$

measured at a temperature of 25-300 °C, wherein:

l = length at T_1

l_0 = length at T_0

ΔT = $(T_1 - T_0)$

Δl = $(l - l_0)$

has a value according to which $\alpha > 3{,}4.10^{-6}\ K^{-1}$.

18. An optical fibre according to claim 17, characterized in that $\alpha > 4{,}0.10^{-6}\ K^{-1}$.

19. A device for contracting said ~~a~~ substrate tube into a massive or non-massive preform, comprising means for rotating the substrate tube, means for heating the substrate tube and means for supporting the substrate tube, characterized in that the device furthermore comprises means for fitting a protective tube round the substrate tube, substantially along the entire length thereof, means for supplying gases to the annular space present between the outer circumference of the hollow substrate tube and the inner circumference of the protective tube, and means for generating a non-isothermal plasma in said annular space.

~~20. A device according to claim 19, characterized in that the device furthermore comprises means for rotating the protective tube.~~

depositing one or more glass layers onto the internal surface of a hollow substrate tube and

means for supplying one or more reactive gas mixtures of glass forming compounds to the interior of the hollow substrate tube,